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# Russian palatalization: the true(r) story

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# Plan for talk

## 1 Surface inventory



# Plan for talk

- 1 Surface inventory
- 2 Redux on traditions within the generative approach



# Plan for talk

- 1 Surface inventory
- 2 Redux on traditions within the generative approach
- 3 Evidence against following assumptions:



# Plan for talk

- ❶ Surface inventory
- ❷ Redux on traditions within the generative approach
- ❸ Evidence against following assumptions:
  - Six contrastive vowels



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  - Palatalized velars are noncontrastive



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- ❺ Evidence for substance-free phonology



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- ➎ Evidence for substance-free phonology
- ➏ Evidence against multiple-level derivations



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  - PSM and standard OT provide an adequate account
- ➎ Evidence for substance-free phonology
- ➏ Evidence against multiple-level derivations
- ➐ Some implications



# Outline

- 1 Data
  - Inventories
  - Distributions
  - Palatalization and depalatalization
- 2 Approaches and problems
  - Generative approaches
  - Challenging the assumptions
- 3 The proposal
  - Assumptions
  - Analysis
  - Further issues





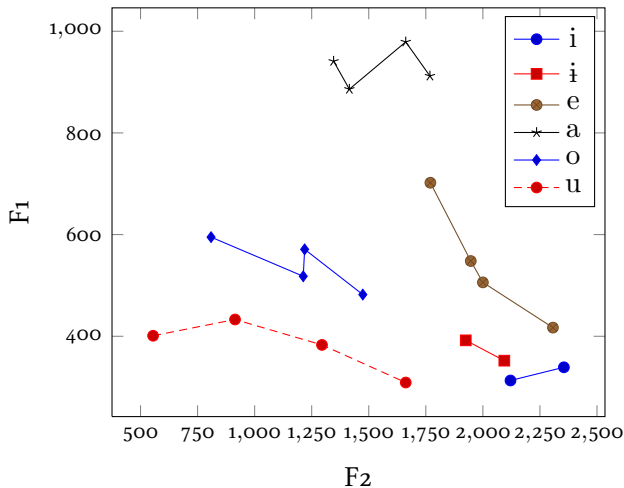
# Consonant inventory

Manner	Labial		Dental		Postalveolar		Palatal	Dorsal	
Plain stop	p	b	t	d				k	g
Palatalized stop	p <sup>j</sup>	b <sup>j</sup>	t <sup>j</sup>	d <sup>j</sup>				k <sup>j</sup>	g <sup>j</sup>
Plain fricative	f	[v]	s	z	ʂ <sup>w</sup>	ʐ <sup>w</sup>	[j]	x	
Palatalized fricative	f <sup>j</sup>	[v <sup>j</sup> ]	s <sup>j</sup>	z <sup>j</sup>	ʂ <sup>j</sup>	(ʐ <sup>j</sup> )		x <sup>j</sup>	
Plain affricate			ts						
Palatalized affricate				tʃ <sup>j</sup>					
Plain nasal	m		n						
Palatalized nasal	m <sup>j</sup>		n <sup>j</sup>						
Plain lateral				ɭ					
Palatalized lateral				ɭ <sup>j</sup>					
Plain trill/flap				r/r					
Palatalized trill/flap				r <sup>j</sup> /r <sup>j</sup>					
Approximant		[ɹ]					[j]		
Palatalized approximant		[ɹ <sup>j</sup> ]							

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Plain fricative	f	[v]	s	z	ʂ <sup>w</sup>	ʐ <sup>w</sup>	[j]	x	
Palatalized fricative	f <sup>j</sup>	[v <sup>j</sup> ]	s <sup>j</sup>	z <sup>j</sup>	ʂ <sup>j</sup>	(ʐ <sup>j</sup> )		x <sup>j</sup>	
Plain affricate			ts						
Palatalized affricate			t <sup>j</sup> s						
Plain nasal	m		n						
Palatalized nasal	m <sup>j</sup>		n <sup>j</sup>						
Plain lateral				ɭ					
Palatalized lateral				ɭ <sup>j</sup>					
Plain trill/flap				r/r					
Palatalized trill/flap				r <sup>j</sup> /r <sup>j</sup>					
Approximant		[ɹ]					[j]		
Palatalized approximant		[ɹ <sup>j</sup> ]							

# Vowel inventory: stressed syllables



# Vowel inventory: stressed syllables

- Five or six vowels
- Strong coarticulation effects with palatalized consonants
- [i] and [ɨ] in complementary distribution:
  - [i] following palatalized consonants and syllable-initially
  - [ɨ] following non-palatalized consonants (and some extremely marginal syllable-initial examples)
- Otherwise syllable-initial vowels are realized as if preceded by a non-palatalized consonant



# Distribution of palatalization: non-dorsals

- Labials and coronals contrast for palatalization across all positions
- Before non-front vowels:

- (1) a. ['maɫ] 'small'  
b. ['mʲaɫ] 'crumbled, kneaded (pa. t.)'
- (2) a. ['tɔk] 'flow (n.)'  
b. ['tʲɔk] 'flowed (pa. t.)'

- Before front vowels

- (3) Before [i]/[i̯]: what is the underlying contrast?  
a. ['pʲiɫ] 'eagerness'  
b. ['pʲiɫ] '(he) drank'
- (4) Before /e/: [Cɛ] are borrowings, albeit well-nativized  
a. ['tɛstɐ] 'test (gen. sg.)'  
b. ['tʲɛstɐ] 'dough'



# Distribution of palatalization: non-dorsals

- Word-finally there is a contrast for both labials and coronals:

- |     |    |                       |         |
|-----|----|-----------------------|---------|
| (5) | a. | [ <sup>j</sup> mʲeɫ]  | ‘chalk’ |
|     | b. | [ <sup>j</sup> mʲeɫʲ] | ‘shoal’ |
| (6) | a. | [pɾaf]                | ‘right’ |
|     | b. | [pɾafʲ]               | ‘rule!’ |

- So far it all seems unremarkable...



# Distribution of palatalization: dorsals

- Not with dorsals, though
- No contrast word-finally:

(7) a. ['ma<sup>k</sup>] 'poppy'  
b. \*['ma<sup>kʲ</sup>] '???'

- Palatalized velars before non-front vowels: almost exclusively borrowings

(8) a. ['gʲujs] 'naval jack'  
b. [pənʲɪ'kʲor] 'panic-monger'

- Plus (in Standard Russian) one verb with a morphologically conditioned [k]~[kʲ] alternation (Flier, 1982):

(9) a. [t<sup>k</sup>atʲ] 'to weave'  
b. [t<sup>kʲ</sup>ot] '(s)he weaves'

- More in dialects



# Distribution of palatalization: dorsals

- Velars before front vowels
- If the vowel is /e/, velars are not palatalized only in a very few borrowings
- For [i]/[ɨ]:
  - Normally, velars are palatalized

- (10) a. ['kʲinʊtʲ] 'throw'  
 b. \*['kɨnʊtʲ] '???'

- Only extremely few borrowings (mostly from Turkic) with [kɨ gɨ xɨ], normally have variants with [kʲi gʲi xʲi]

- (11) a. ['kɨr'gɨs] 'Kyrgyz'  
 b. ['kʲir'gʲis] 'id.', more frequent





# Distribution of palatalization: dorsals

- Complication for [i]/[i̯]: [k̑i̯ gi̯ xi̯] are allowed across word boundaries, cf.

- (12)
- |    |                          |           |
|----|--------------------------|-----------|
| a. | [ <sup>h</sup> k̑i̯ȓi̯] | ‘to Kira’ |
| b. | [ <sup>h</sup> i̯ȓ]     | ‘Ira’     |
| c. | [ <sup>h</sup> k̑i̯ȓi̯] | ‘to Ira’  |

- Overall, these facts are normally used to support the claim that palatalization on dorsals is always derived
- How does this square with the unremarkable status of palatalization on non-dorsals?



# Palatalization types

- At morpheme edges, we encounter various palatalization-related phenomena
- We concentrate on four types:
  - Surface palatalization
  - Retraction
  - Velar palatalization
  - Transitive palatalization



# Surface palatalization

- Non-dorsals turn into their palatalized correspondents, normally before suffixes starting with [i] and [e]

- (13) a. ['xvost<sup>t</sup>] 'tail'  
 b. ['xvos<sup>j</sup>t<sup>j</sup>ik] 'small tail'
- (14) a. [mɐs'kv<sup>a</sup>] 'Moscow'  
 b. [v mɐs'kv<sup>j</sup>e] 'in Moscow'

- We come back to dorsals later



# Retraction

- Across prefix–stem and preposition–word boundaries (at least), stem- resp. word-initial [i] is realized as [ɨ] and does not palatalize a preceding non-palatalized consonant

- (15) a. [ɪ'gratʲ] 'play (imperfective)'  
 b. [sɪ'gratʲ] 'play (perfective)'
- (16) a. [ɪ'gra] 'game'  
 b. [vɪ'grʲe] 'in the game'

- Uncanny similarity to the [kɨ gɨ xɨ] context



# Velar palatalization

- /k g x/ → /tʃʲ zʲw sʲw/
- Mostly before suffixes starting with /i/ or /i/ and /e/ or /o/
- Long story on the /e/ → /o/ shift omitted here

- (17) a. ['mo<sup>x</sup>] 'moss'  
 b. ['m<sup>sʲw</sup>istij] 'mossy'
- (18) a. [sɐ'ba<sup>kɐ</sup>] 'dog'  
 b. [sɐbɐ'tʃʲonkɐ] 'small dog'



- /t d s z/ → /tʃʒ zʷ ʃʷ zʷ/
- “Many disparate changes”; “extremely opaque process” (Rubach, 2000)
- Caused by all sorts of miscellaneous suffixes (which historically contain a lost \*j)

- (19) a. [gəre'da] 'cities'  
b. [gəre'z<sup>w</sup>an<sup>j</sup>in] 'city-dweller'

- Rubach (2000): “best treated as instances of allomorphy”, and of Rubach & Booij (2001) for Polish



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# The historical legacy

- Halle (1959) is of course the original generative treatment of Russian
- Just like Chomsky & Halle (1968) (or is it the other way around?), relies rather heavily on restating history through rules
- Russian generative phonology a sprouting industry: Lightner (1972) is just one example
- Should we expect newer literature to ditch those assumptions and turn to the surface?
- Hasn't happened. In fact, what we may call the Iowa–Warsaw school (Rubach, 2000, 2007; Plapp, 1999; Mołczanow, 2007) argues rather forcefully that Russian is a prime example against parallel OT





# The big question

- How do we treat lexical and morphological palatalization?
- Is it just front vowels spreading [–back] to consonants?
- Especially available in a theory which has all sorts of absolute neutralization (Halle, 1959; Lightner, 1972)
- “Vowel power” versus “consonant power” (Hamilton, 1976)
- This has essentially boiled down to the [i]/[i̟] question
- Plapp (1999): the two-vowel account is superior to the one-vowel account conceptually. Empirically both work equally well (?), but two vowels is more economic, because it does not need stipulative specification and reduces the number of contrasts/segments



# The two-vowel account

- Two underlying vowels: /i/ and /i̯/, one is [−back], the other [∅back] or [+back]

Rule	/gotov-it <sup>j</sup> /	/gotov-ij/
Surface palatalization	/gotov <sup>j</sup> -it <sup>j</sup> /	
Output	[gɐ'tov <sup>j</sup> it <sup>j</sup> ] 'prepare'	[gɐ'tovij] 'ready'



# The two-vowel account

- In the case of velars, there is a counterfeeding order between velar palatalization and /i/-fronting

Rule	/nos-i/	/los <sup>j</sup> -i/	/muk-i/	/muk-it <sup>j</sup> /
Velar pal.				/mutʃ <sup>j</sup> it <sup>j</sup> /
Fronting		/los <sup>j</sup> -i/		
/i/-fronting			/muk-i/	
Surface pal.			/muk <sup>j</sup> -i/	
Output	[nɐ'si] 'noses'	[ˈlos <sup>j</sup> ɪ] 'moose (pl.)'	[ˈmuk <sup>j</sup> ɪ] 'torments'	[ˈmutʃ <sup>j</sup> it <sup>j</sup> ] 'to torment'



# The two-vowel account

- The two-vowel account needs three types of consonant-vowel interaction:
  - [−back] spreads R → L: surface palatalization
  - [−back] spreads L → R: complementary distribution of [i] and [ɨ]
  - [+back] spreads L → R: retraction
- Of course this will only work with a complicated computation: rule ordering (Halle & Matushansky, 2002), Lexical Phonology (Plapp, 1999), multi-level OT of one type (Rubach, 2000) or another (Blumenfeld, 2003)
- But how warranted is this complicated system?
- I take issue with three assumptions here:
  - That it is meaningful to talk of the segment [ɨ]
  - That [k<sup>j</sup> g<sup>j</sup> x<sup>j</sup>] can only be derived before /i/
  - That [i]/[ɨ] is a unique pair in Modern Russian



# The phonetics of [ɨ]

- It has been known to Russian phoneticians since at least Tomson (1905) that there is no [ɨ], which is in fact a diphthong, something like [ʉ<sup>i</sup>]
- Since at least Padgett (2001) this has (should have) been known to Western scholars too
- Phonetic data provide evidence that the distinction between [ɨ] and [i] is phonetic and purely contingent on the (lack of) palatalization of the preceding consonant (via enhancement?)
- Though this is not the interpretation provided by Padgett (2001)
- So if “[ɨ]” is not a phonetic segment, what is it phonologically?
- Leaving the velars aside momentarily, it just seems that there is a difference between [ɨ] which causes surface palatalization and [i] which does not



# Palatalization of velars

- It is claimed that palatalized velars before non-front vowels are “marginal” to Russian phonology and in general palatalization in velars is non-distinctive
- Borrowings like *g’uj’s* ‘naval jack’ and *K’ol’n* ‘Cologne’ are well nativized
- Contrast with the absence of [kʲi gʲi xʲi] which is a genuine gap: the two or three words that do exist usually have [kʲi gʲi xʲi] variants as with *kyrgyz/kirgiz*



# Palatalization of velars

- Integration of surface palatalization of velars into the morphology
- There is the ‘weave’ verb: only one in MSR, as a result of dialect mixing; Southern Russian dialects have a lot more verbs of this sort
- Then there is a diminutive suffix which causes velar palatalization in the native lexicon but can cause surface palatalization in novel words:

- (20) a. [ˈvɒlk] ‘wolf’  
b. [vɐlˈtʃʲonək] ‘wolf cub’
- (21) a. [mɐˈkakɐ] ‘macaque’  
b. [məkɐˈkʲonək] ‘small macaque’  
([məkɐˈtʃʲonək] possible but rare)



# Palatalization of velars

- Then there is the gerundive suffix /-a/ which causes velar palatalization in the standard but surface palatalization colloquially

- (22)
- |    |  |                        |
|----|--|------------------------|
| a. | [z <sub>l</sub> <sup>w</sup> gu]               | ‘I burn (tr.)’         |
| b. | [z <sub>l</sub> z <sup>w</sup> a]              | ‘burning’ (standard)   |
| c. | [z <sub>l</sub> <sup>w</sup> g <sup>j</sup> a] | ‘burning’ (colloquial) |

- Is there a reasonable way to do this if [k<sup>j</sup> g<sup>j</sup> x<sup>j</sup>] can only appear before /i/?





# Palatalization of velars

- More general point: can morphophonology recycle a representation that is not phonological?
- Made separately by Flier (1982) and Kasatkin (1999)
- Kasatkin (1999): verbal paradigms of the [ʼtkʲot] type appear (though not exclusively) in those dialects where /kʲ gʲ xʲ/ arise independently due to progressive palatalization assimilation

- (23) a. [dʲenʲgʲam]                      ‘money (dat. pl.)’  
b. [marskʲoj]                      ‘naval’, from \*morsʲkoj

- Also: gerunds of the [zʷgʲa] type are a characteristic feature of North-West Old Russian (Zaliznyak, 2004), where /kʲ gʲ xʲ/ were always present
- Morphophonology makes free use of palatalized velars, so maybe we can get them from sources other than “/i/”

# Palatalization of velars

- An overlooked aspect of the palatalization of velars concerns unstressed /-e/ suffixes which are realized as [-ɪ] but do not cause velar palatalization

- (24)    a.    [ru'kʲe]                      'hand (dat. sg.)'  
          b.    ['mukʲɪ]                    'torment (dat. sg.)'

- Similar facts for imperative /-i/
  - One solution is Lexical Phonology via exclusion of velar palatalization from the word level (Plapp, 1996; Blumenfeld, 2003)
  - At best, even if palatalized velars are always derived, their distribution is not a compelling argument for /i/
- 👉 Palatalized velars are contrastive segments on a par with other palatalized consonants
- Same conclusion by Padgett (2003) though from different premises



# Front vowels galore

- The /i i/ theory predicts the following categories:
  - /ki ti/ → /tʃʲi tʲi/
  - /ki ti/ → /kʲi ti/
  - Additional assumptions: /ki ti/ → /kʲi tʲi/
- Here's an example:

- (25) a. [kɐ'rovɐ] 'cow'  
b. [kɐɐ'vʲonkɐ] 'small cow'
- (26) a. [sɐ'bakɐ] 'dog'  
b. [sɐbɐ'tʃʲonkɐ] 'small dog'

- In terms of palatalization, this looks quite like /i/
- Is there an /ø/ in Russian?



# Front vowels galore

- Now consider these examples:

- (27) a. [du**b**ɐ] ‘oak (gen. sg.)’  
 b. [du'**b**ok] ‘small oak’
- (28) a. [krʲʊ'**k**a] ‘hook (gen. sg.)’  
 b. [krʲʊ'**tʲ**ok] ‘small hook’

- Quite apart from the fact that /o/ triggers velar palatalization...
- ...the system is set up in such a way that if a segment triggers velar palatalization, this implies that it triggers surface palatalization of non-velars



# Front vowels galore

Other consonants	Velars and [tʰs]		
	None	Surface	Velar
None	✓		✓
Surface	✓	✓	✓
Transitive			✓

- ✓ = existence of a suffix which imposes the relevant alternations
- Shaded cells indicate possible types of suffixes under a charitable interpretation of the theory where palatalization is due to [–back] spreading from the vowel itself
- The theory **undergenerates**



# Front vowels galore

Palatalization effect	Suffix-initial vowel				
	/i/	/e/	/a/	/o/	/u/
None			✓	✓	✓
VP only				✓	
Surface velars only	✓			✓	
Surface all consonants	✓	✓	(✓)		
Surface non-velars & VP	✓	✓	✓	✓	✓
VP & TP	✓	✓	✓	✓	✓

- **Some** generalizations can be made on the relation of vowel quality and palatalization
- But certainly not the neat one
- Highlighted row: all vowels can be /i/!



## Conclusion (kind of)

- A theory where the palatalization effects of vowels derive from their featural content is inadequate for two reasons:
  - In its simplest form, it fails to derive all the facts even for the front vowels and needs a lot of computation-related tweaking (e. g. multiple levels), and it is not obvious it can be done even then
  - Even so, the ability of [+back] vowels to trigger palatalization is quite unexpected
- Do we have a front/back pairing for all vowels in Russian, plus the extra computation?
- This has actually been tried! See DeArmond (1979); Kharytonava (2009)
- But is there a better way?



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# Argument

- Squarely a “consonant power” (Hamilton, 1976) approach
- Palatalization on consonants is independent of the quality of the following vowel
- Front vowels (or indeed any vowels) do not spread their features onto consonants (with one exception)
- Morpheme-edge palatalization is due to a **floating feature**
  - Cf. Bidwell (1962) for Russian and Gussmann (1992) for Polish
- Surface palatalization is the addition of a V-place[coronal] feature
- Velar/transitive palatalization is displacement of underlying place with the V-place[coronal] feature
- The choice of palatalization is regulated by the ranking



# Place specifications

- Using the Parallel Structures Model of feature geometry (Morén, 2003)
- Partial specification, ignoring manner and laryngeal features

Consonants	C-place			V-place
	[lab]	[cor]	[dor]	[cor]
/p/	✓			
/p <sup>j</sup> /	✓			✓
/t/		✓		
/t <sup>j</sup> /		✓		✓
/k/			✓	
/k <sup>j</sup> /			✓	✓
/t <sup>j</sup> /				✓
/ts/				


# Constraints


- MAX[F]: “keep tokens of features present in the underlying representations”
- DEPLINK[F]: “do not attach features to segments to which they are not attached underlyingly”
- \*[F]: “do not have feature [F] on the surface”
- \*DEPLINK[F<sub>1</sub>]&\*[F<sub>2</sub>]: “do not attach [F<sub>1</sub>] to a segment containing [F<sub>2</sub>]”
- (Alternatively, use a more elaborate schema for DEPLINK à la Morén, 2001, i. e. DEPLINK[F<sub>2</sub>](F<sub>1</sub>))
- SPREAD: whatever constraint favours the spreading of underlying V-place[coronal], e. g. domain binarity
- Morphological indexation: if a constraint is indexed for a set of morphemes, it is vacuously satisfied by morphemes with a different index (Pater, 2009)



# Easy case: no floating features


- Note: we are using /i/ as the vowel for expository purposes.  
we assume that it consists just of the feature V-place[coronal]

ti	DEPLINK(V-pl[cor])&*C-pl[cor]	MAX(V-pl[cor])	SPREAD
a.  ti			*
b. tʲi	*!		

tʲi	DEPLINK(V-pl[cor])&*C-pl[cor]	MAX(V-pl[cor])	SPREAD
a. ti		*!	*
b.  tʲi			*

## No [ki gi xi]

- We propose that the lack of word-internal [ki gi xi] is phonological and arises from SPREAD dominating DEPLINK(V-pl[cor])&\*C-pl[dor]

ki	SPREAD	DEPLINK(V-pl[cor])&*C-pl[dor]
a.  kʲi		*
b. ki	*!	

- But spreading is blocked by the left boundary of the stem/word
- This gives “retraction” for free: it is just lack of spreading, with the non-palatalized consonants being velarized and giving the [ɨ] impression



# Surface palatalization

- Surface palatalization is the addition of floating V-pl[cor]
- To save space, DEPLINK is forthwith understood as conjoined with the relevant markedness constraint

	t <sup>j</sup> i	MAX(V-pl[cor])	MAX(C-pl[cor])	DEPLINK(V-pl[cor])
a.	ti	*!		
b.	☞ t <sup>j</sup> i			*
c.	t <sup>j</sup> i		*!	

- This works identically for dorsals and non-dorsals

# Velar palatalization

- For velar palatalization, DEPLINK is ranked higher than MAX(C-place) but MAX(V-pl[cor]) is still unviolated, so the C-place feature is deleted to ensure satisfaction of the conjoined constraint
- Normally this would be a ranking conflict, but that's why we need morphological indexation

	$t^j i_\alpha$	MAX(V-pl[cor])	DEPLINK(V-pl[cor]) & *C-pl[cor] $_\alpha$	MAX(C-pl[cor])
a.	$t^j i_\alpha$	*!		
b.	$t^j i_\alpha$		*!	
c.	$t^{\widehat{j}} i_\alpha$			*



# Labial epenthesis

- Labials are not deleted in transitive palatalization contexts, but instead a [lʲ] is epenthesized
- This means that MAX(C-pl[lab]), MAX(V-pl[cor]) and DEPLINK are all unviolated, but DEP (“do not epenthesize”) is
- Morén (2006) proposes for Serbian that [ʎ] is epenthesized to comply with sonority sequencing

	p <sup>j</sup> i	MAX(C-pl[lab])	MAX(V-pl[cor])	DEPLINK	“SONSEQ”	DEP
a.	p <sup>j</sup> i			*!		
b.	pt <sup>j</sup> i				*!	*
c.	pl <sup>j</sup> i					*

- SONSEQ is a cover constraint here
- TETU: best possible epenthetic segment given the conditions





# Overgeneration is good!

- Quite obviously, this system is very powerful:
  - A suffix starting with any vowel can cause any palatalization for any consonant
  - A single suffix can cause different palatalization effects for different consonants
- But this is good
- Because that's how modern Russian works



# Implications

- Various palatalization phenomena in Russian are amenable to a fully parallel account
- Caveat:
  - The blocking of V-place[cor] spreading across left edges might be a cyclic effect
- The morphological generalizations of Blumenfeld (2003) (VP only at stem level) can be restated in terms of indices
- No stance on whether serialist OT is necessary in general, e. g. for architectural reasons
- But Russian does not provide compelling evidence for it



# More implications

- Note that  $[s^w]$  and  $[z^w]$ , which are not palatalized on the surface, bear a V-place[coronal] feature
- For authors such as Rubach (2000); Mołczanow (2007) this is a further argument for serialism
- But this is because for them the distinction between  $[i]$  and  $[i̟]$  is phonological
- In fact, we have seen this is phonetics
- The relevant segments also behave like they are palatalized in vowel reduction
- So there is no stipulative serialism, just the modular phonology-phonetics interface



# Conclusions and outlook

- Palatalized velars are normal segments
- There is very little consonant-vowel interaction in the “normal” sense
- Palatalizations are caused by a floating feature and parallel computation
- More powerful theory of palatalization, but also empirically better

## Further outlook

- Solve residual issues (especially the  $[\widehat{ts}]$ -velars parallelism)
- Work up full feature specification
- Dovetail with account of reduction (ask) and assimilation

